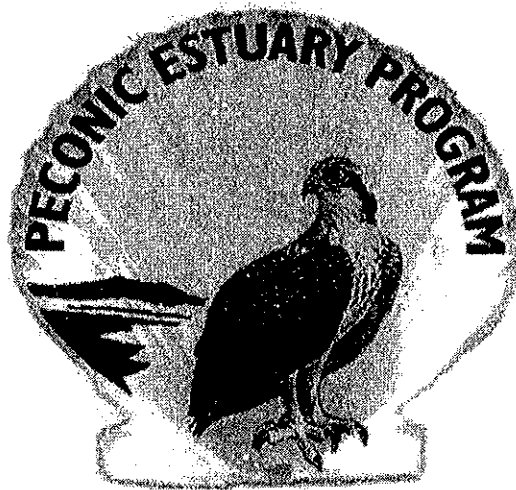


draft

**PECONIC ESTUARY PROGRAM
EXISTING LAND USE INVENTORY**



Suffolk County Department of Planning
220 Rabro Drive
P. O. Box 6100
Hauppauge, New York 11788-0099

January 1997

PECONIC ESTUARY PROGRAM EXISTING LAND USE INVENTORY

Suffolk County Department of Planning

Stephen M. Jones
Director

Environmental Analysis & Research Divisions

DeWitt Davies
Lauretta Fischer
Peter Lambert
Ron Verbarg
Carol Walsh
Douglas Winkler

Cartographic & GIS Division

James Daly
Tom Frisenda
Ron Green
Lia Ladore
Vinnie LeoGrande
Carl Lind

Support Staff

Lucille Gardella
Sandy Martin

The Planning Department acknowledges the assistance of the following agencies and individuals in the completion of this inventory report.

Suffolk County Real Property Tax Service Agency

John Blodorn

Steve Mussler

Suffolk County Department of Health Services

Peter Hoffman

Suffolk County Department of Civil Service - Management Information Systems

Richard Hynes

Suffolk County Water Authority

Jeff Altorfer

Vinnie Lautato

Town of East Hampton Planning Department

Lisa Liquori
JoAnne Pahwul

Ronald Pirrelli
Marguerite Wolffsohn

United States Geological Survey - Water Resources Division

Christopher E. Schubert

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MAPS

The 13 GIS maps that accompany this report are identified below.

- Land Use Inventory and Analysis Study Area Map - 1" = 1 mile
- Study Area Map Series - 1" = 2,000'
 - Town of Brookhaven
 - Town of Riverhead
 - Town of Southold
 - Town of Shelter Island
 - Town of Southampton
 - Town of East Hampton
- Existing Land Use Map Series - 1" = 2,000'
 - Town of Brookhaven
 - Town of Riverhead
 - Town of Southold
 - Town of Shelter Island
 - Town of Southampton
 - Town of East Hampton

INTRODUCTION

Previous Land Use Studies

Existing land use maps and tabulations of land use acreage data on a town-wide basis for the six towns in the Peconic Estuary watershed are available that reflect conditions in 1962 (Suffolk County Dept. of Planning 1962), 1966 (Nassau-Suffolk Regional Planning Board 1968) and 1981 (Long Island Regional Planning Board 1982). These studies, conducted on a County-wide basis, are useful in that they provide a general picture of the location and interrelationships of major land use types at different times in the past. However, each of these studies differs with respect to the methodology employed to classify categories of land use, the scale of the base maps used, the level of effort and techniques employed in verifying land use, the extent to which mapped land uses have been generalized, and how acreage figures were generated. Therefore, comparison of the results of these inventories to determine accurate trends is invalid.

The need for up-to-date, accurate land use data collected at a large scale was recognized in the Brown Tide Comprehensive Assessment and Management Program (BTCAMP) (Suffolk County Dept. of Health Services 1992). The land use inventory conducted in 1988 for the Peconic River/Flanders Bay watershed was prepared at tax map scale and field verified. The Department of Health Services Geographic Information System (GIS) was employed to plot the existing land use map for the study area showing 13 categories of land use and to generate acreage figures. The map, however, reflected generalized land use patterns, since digitized tax map coverages showing parcel boundaries were not available at that time. The recommendation

was made in BTCAMP to conduct an in-depth analysis of existing land use, population and land available for development for the entire watershed of the Peconic Estuary System using GIS technology to plot maps and generate acreage data at tax map scale. The establishment of the Peconic Estuary Program (PEP) provided the vehicle and focus for implementing this recommendation.

Study Objectives

The objectives of this inventory are as follows:

- Establish an accurate GIS existing land use data base at tax map scale (i.e., large scale) for the entire Peconic Estuary watershed. This data base should be prepared using a consistent approach so that the results are comparable among the various town and village jurisdictions involved.
- Prepare GIS existing land use maps in digital and print formats for that portion of the watershed located within each township.
- Quantify existing land use acreage by general category, jurisdiction and watershed zone.

METHODOLOGY

Data Management and Scale

The Suffolk County Planning Department's GIS was employed to link land use data with parcels shown on the Suffolk County Real Property Tax Map. [This GIS consists of ESRI ARC/INFO GIS software running on a Data General Aviiion 8500 dual processor UNIX server with a HP 650C color ink jet plotter. Back up copies of all hard copy maps are archived plotter output (GRA and HPG files) on 8mm tape in TAR format. To access digital land use maps on a PC with ARC/VIEW requires 16 meg of main memory and 1 gig of disc memory.] Land use data were collected at tax map scale. Although the scale of the Suffolk County Real Property Tax Maps for the towns bordering the Peconic Bay System varies, it is typically 1" = 300'. The existing land use display maps that accompany this report have been greatly reduced, i.e., the scale of these maps (1" = 2000') is an order of magnitude smaller than that of the tax maps. However, tax map parcel boundaries were not altered in any way by GIS manipulation. This preserved the sanctity of the parcel line work and land use data base. The extent to which small parcels can be visually distinguished depends on the scale selected for GIS map plotting.

Land Use Classification System

Use of town tax assessor code data expedited the attainment of PEP land use inventory objectives. These data sets were available in electronic format and keyed to Suffolk County tax map parcels. They provided a starting point for the land use inventory work.

Peconic Estuary Program Existing Land Use Inventory

Tax assessor codes are assigned to parcels for the purpose of raising revenue through real property taxation. There are literally scores of codes assigned to ratable property. To facilitate interpretation, the PEP land use methodology grouped these codes under the following 13 general land use categories that are commonly used for regional planning purposes: low density residential, medium density residential, high density residential, commercial, industrial, institutional, recreation and open space, agriculture, vacant, transportation, utilities, waste handling and management, and surface waters. Table 1 shows the general land use categories and the property type classification and ownership codes assigned to each category. The groupings in this table do not necessarily reflect the divisions in the assessor's manual (New York State Division of Equalization and Assessment 1991). The 13 general land use categories are more suitable for characterizing community layout and function, determining land available for development, estimating future population levels and preparing master plans. Each and every parcel on the tax map was assigned to one (and only one) of the general categories.

Land Use Study Area Boundaries

A U.S. Geological Survey (USGS) map showing the boundaries of the groundwater contributing area of the Peconic Estuary System on the north and south forks and Shelter Island, as well as the boundaries of its constituent sub-watersheds, was used as the primary source of information for defining the upland area subject to land use inventory and analysis (Christopher E. Schubert pers. comm.). The groundwater divide was superimposed on the tax map base for the Towns of Brookhaven, Riverhead, Southold, Shelter Island, Southampton and East

Table 1. Land Use Classification System for the Peconic Estuary Program (p.1 of 5)

**Low Density Residential (≤ 1 d.u./acre)* -
attribute code 1 - symbol #83 - yellow****

- 210 One Family Year-Round Residence
- 220 Two Family Year-Round Residence
- 230 Three Family Year-Round Residence
- 240 Rural Residence with Acreage
- 250 Estate
- 260 Seasonal Residences
- 270 Mobile Home
- 312 Residential Land Including a Small Improvement (not used for living accommodations)
- 316 Waterfront Vacant Land Including a Small Improvement (not used for living accommodations)
- 439 Small Parking Garage
- 483 Converted Residence

Medium Density Residential (>1 to <5 d.u./acre)* -

attribute code 2 - symbol #84 - gold**

- 210 One Family Year-Round Residence
- 220 Two Family Year-Round Residence
- 230 Three Family Year-Round Residence
- 260 Seasonal Residences
- 270 Mobile Home
- 312 Residential Land Including a Small Improvement (not used for living accommodations)
- 316 Waterfront Vacant Land Including a Small Improvement (not used for living accommodations)
- 439 Small Parking Garage
- 483 Converted Residence

**High Density Residential (≥ 5 d.u./acre)* -
attribute code 3 - symbol #92 - peru****

- 210 One Family Year-Round Residence
- 220 Two Family Year-Round Residence
- 230 Three Family Year-Round Residence
- 260 Seasonal Residences
- 270 Mobile Home
- 271 Multiple Mobile Homes
- 280 Multiple Residences
- 312 Residential Land Including a Small Improvement (not used for living accommodations)
- 316 Waterfront Vacant Land Including a Small Improvement (not used for living accommodations)
- 410 Living Accommodations
- 411 Apartments
- 416 Mobile Home Parks (trailer parks, trailer courts)
- 439 Small Parking Garage
- 483 Converted Residence

*Parcels designated as residential require lot size calculation to determine residential density classification (low, medium or high density).

The symbol # and color assigned to each land use category were selected from the shadeset of **Colornames in **ARC/INFO Ver 7.04**.

Peconic Estuary Program Existing Land Use Inventory

Table 1. Land Use Classification System for the Peconic Estuary Program (p.2 of 5)

Commercial -		473	Greenhouses (retail sales)
attribute code 4 - symbol #110 - red**		474	Billiards
414	Hotel	480	Multiple Use of Multi purposes
415	Motel	481	Downtown Row Type (with common wall)
417	Camps, Cottages, Bungalows	482	Downtown Row Type (detached)
418	Inns, Lodges, Boarding & Rooming Houses, Tourists Homes, Fraternity & Sorority Houses	484	One Story Small Structure
420	Dining Establishments	485	One Story Small Structure - Multi-occupant
421	Restaurants	486	Minimart
422	Diners & Luncheonettes	510	Entertainment Assembly
423	Snack Bars, Drive-Ins, Ice Cream Bars	511	Legitimate Theaters
424	Night Clubs	512	Motion Picture Theaters
425	Bar	513	Drive-in Theaters
426	Fast Food Franchises	514	Auditoriums, Exhibition & Exhibition Halls
430	Motor Vehicle Services	515	Radio, T.V. & Motion Picture Studios
431	Auto Dealers - Sales & Svc.	520	Sports Assembly
432	Service & Gas Stations	521	Stadiums, Arenas, Armories, Field Houses
433	Auto Body, Tire Shops, Other Related Auto Sales	522	Racetracks
434	Automatic Car Wash	530	Amusement Facilities
435	Manual Car Wash	531	Fairgrounds
436	Self-Service Car Wash	532	Amusement Parks
437	Parking Garage	533	Game Farms
438	Parking Lot	534	Social Organizations
450	Retail Services	540	Indoor Sports Facilities
451	Regional Shopping Centers	541	Bowling Centers
452	Area of Neighborhood Shopping Centers	542	Ice or Roller Skating Rinks
453	Large Retail Outlets	543	YMCAs, YWCAs, etc.
454	Large Retail Food Stores	544	Health Spas
455	Dealerships - Sales & Services (other than auto with large scale operation)	545	Indoor Swimming Pools
460	Bank & Office Buildings	546	Other Indoor Sports
461	Standard Bank/Single Occupant	550	Outdoor Sports Activities
462	Drive-in Branch Bank	554	Outdoor Swimming Pools
463	Bank Complex w Office Bldg.	555	Riding Stables
464	Office Building	556	Ice or Roller Skating Rinks
465	Professional Building	557	Other Outdoor Sports
470	Miscellaneous Services	570	Marinas
471	Funeral Homes	583	Resort Complexes
472	Dog Kennels, Veterinary Clinics	691	Professional Associations

The symbol # and color assigned to each land use category were selected from the shadeset of **Colornames in **ARC/INFO Ver 7.04**.

Peconic Estuary Program Existing Land Use Inventory

Table 1. Land Use Classification System for the Peconic Estuary Program (p.3 of 5)

Industrial -	Institutional -
attribute code 5 - symbol #127 - purple**	attribute code 6 - symbol #45 - deep sky blue**
440 Storage, Warehouse & Distribution Facilities	610 Education
441 Gasoline, Fuel, Oil, Liquid Petroleum Storage and/or Distribution	611 Libraries
442 Bottled Gas, Natural Gas Facilities	612 Schools
443 Grain & Feed Elevators, Mixers, Sales Outlets	613 Colleges & Universities
444 Lumber Yards, Sawmills	614 Special Schools & Institutions
445 Coal Yards, Bins	615 Other Educational Facilities
446 Cold Storage Facilities	620 Religious
447 Trucking Terminals	630 Welfare
448 Piers, Wharves, Docks & Related Facilities	631 Orphanages
449 Other Storage, Warehouse & Distribution Facilities	632 Benevolent & Moral Associations
475 Junkyards	633 Homes for the Aged
710 Manufacturing & Processing	640 Health
720 Mining and Quarrying	641 Hospitals
721 Sand & Gravel	642 All Other Health Facilities
740 Industrial Product Pipelines (non-utility companies)	652 Office Building (Government)
741 Gas	653 Parking Lots (associated with government building)
742 Water	660 Protection
743 Brine	661 Army, Navy, Air Force, Marine & Coast Guard installations, Radar, etc.
744 Petroleum Products	662 Police & Fire Protection, Electrical Signal Equipment & Other Facilities for Fire, Police, Civil Defense, etc.
749 Other	670 Correctional
	680 Cultural and Recreational
	681 Cultural Facilities (museums, art galleries)
	693 Indian Reservations
	694 Animal Welfare Shelters

The symbol # and color assigned to each land use category were selected from the shadeset of **Colornames in **ARC/INFO Ver 7.04**.

Table 1. Land Use Classification System for the Peconic Estuary Program (p.4 of 5)

Recreation & Open Space -		Agriculture -	
attribute code 7 - symbol #70 - green**		attribute code 8 - symbol #69 - lawn green**	
190	Fish, Game & Wildlife Preserves	105	Agricultural Vacant Land (Productive)
552	Public Golf Courses	110	Livestock & Products
553	Private Golf Country Clubs	111	Poultry & Poultry Products
560	Improved Beaches	112	Dairy Products
580	Camps, Camping Facilities and Resorts	113	Cattle, Calves, Hogs
	581 Camps	114	Sheep & Wool
	582 Camping Facilities	115	Honey & Beeswax
590	Parks	116	Other Livestock: donkeys, goats
	591 Playgrounds	117	Horse Farms
	592 Athletic Fields	120	Field Crops
	593 Picnic Grounds	129	Acquired Development Rights
682	Nature Trails, Bike Paths, etc.	130	Truck Crops - Mucklands
695	Cemeteries	140	Truck Crops - Not Mucklands
920	Private Hunting & Fishing Clubs	150	Orchard Crops
930	State Owned Forest Land	151	Apples, Pears, Peaches, Cherries, etc.
	932 State Owned Land Other Than Forest Preserve	152	Vineyards
940	Reforested Land & Other Related Conservation Purposes	160	Other Fruits
	941 State Owned Reforested Land	170	Nursery & Greenhouse
	942 County Owned Reforested Land	180	Specialty Farms
960	Public Parks	182	Pheasants
	961 State Owned Public Parks, Recreation Areas, and Other Multiple Uses	<hr/>	
	962 County Owned Public Parks and Recreation Areas	**The symbol # and color assigned to each land use category were selected from the shadeset of Colornames in ARC/INFO Ver 7.04 .	
	963 City/Town/Village Public Parks and Recreation Areas		
970	Other Wild or Conservation Lands		
	971 Wetlands, Either Privately or Governmentally Owned, Subject to Specific Restrictions as to Use		
980	Taxable State Owned Conservation Easements		
990	Other Taxable State Land Assessments		
	993 Transition Assessments for Taxable State Owned Land		
	994 Transition Assessment for Exempt State Owned Land		

Table 1. Land Use Classification System for the Peconic Estuary Program (p.5 of 5)

Vacant -		816	Gas Generation Plant
attribute code 9 - symbol #26 - white**		817	Electric Transmission & Distribution
310	Residential	818	Gas Transmission & Distribution
	311 Residential Vacant Land	820	Water
	313 Waterfront Vacant Lots	822	Water Supply
	314 Rural Vacant Lots ≤10 Acres	830	Communication
320	Rural	831	Telephone
	321 Abandoned Agricultural Land	832	Telegraph
	322 Residential Vac. Land >10 A.	833	Radio
	323 Other Rural Vacant Lands	834	TV other than Community Antenna T.V.
330	Vacant Land Located in Commercial Areas	835	Community Antenna T.V.
340	Vacant Land Located in Industrial Areas	836	Telecommunications
350	Urban Renewal or Slum Clearance	847	Pipelines (used by utility companies)
910	Private Wild & Forest Lands	860	Special Franchise Property
	911 Forest Land	861	Electric & Gas
	912 Forest Land	862	Water
Transportation -		866	Telephone
attribute code 10 - symbol #33 - light grey**		867	Miscellaneous
650	Government	868	Pipelines
	651 Highway Garage	869	Television
692	Roads, Streets, Highways & Parkways, Express or Otherwise including Adjoining Land	Waste Handling & Management -	
821	Flood Control	attribute code 12 - symbol #28 - dk. slate grey**	
840	Transportation	850	Waste Disposal
	841 Motor Vehicle	851	Solid Wastes
	842 Ceiling Railroad	852	Landfills & Dumps
	843 Nonceiling Railroad	853	Sewage Treatment & Water Pollution Control
	844 Air	854	Air Pollution Control
	846 Bridges, Tunnels & Subways	Surface Waters -	
Utilities -		attribute code 13 - symbol #52 - pale turquoise**	
attribute code 11 - symbol #31 - lt. slate grey**		183	Aquatic: oysterlands
810	Electric & Gas	315	Underwater Vacant Land
	812 Electric Power Generation - Coal Burning Plant	845	Water (canal)
	813 Electric Power Generation - Oil Burning Plant	972	Land Under Water, Either Privately or Governmentally Owned
	814 Electric Power Generation - Nuclear Plant	**The symbol # and color assigned to each land use category were selected from the shadeset of Colornames in ARC/INFO Ver 7.04.	
	815 Electric Power Generation - Gas Burning Plant		

Hampton. The land use study area boundary was then drawn using a combination of tax map parcel boundaries - primarily road right-of-ways - that approximated the location of the groundwater divide. Care was taken to be inclusive of the upland area defined by the divide lines. The resulting land use study area boundary lines in the towns are primarily linear and angular, as opposed to curvilinear, since they mirror surveyed land parcel boundaries and roadways. Parcel boundaries were not split in order to avoid the problem of changing the parcel data base, which is indexed by tax map identification number.

U.S. Census maps showing census block boundaries were then used to delineate the approximate location of sub-watershed boundaries in each of the towns. This source of information was used to expedite the population analysis component of the PEP, which is contained in a separate report (Suffolk County Dept. of Planning 1997). Care was taken to avoid splitting block boundaries, i.e., sub-watershed boundaries were drawn to include entire Census blocks.

A map of each town was prepared that shows the boundary of the land use study area and the sub-watershed boundaries within same as determined above. Numerical land use acreage data and population estimates are keyed to the areas delineated on the map set.

Land Use Inventory Process

The following is a brief listing of the steps in the process used for conducting the inventory of existing land use.

- Using the GIS, combine tax map parcel line work with the three digit, tax assessor property code data and prepare a coverage at tax map scale for each town showing 13 general land use category attributes based on grouped assessor code data and residential density criteria.
- Prepare large scale plots of all tax map sections located within the Peconic Estuary watershed area in each township. These plots show the land use attribute code numbers for the 13 general land use categories listed in Table 1, one of which is assigned to each tax map parcel.
- Verify parcel attribute codes via field inspection, aerial photo interpretation, use of Real Property Tax Service Agency property data and owners list files, etc., and manually correct same where necessary on the tax map section plots.
- Correct the GIS data base.
- Merge the tax map section sheets and prepare preliminary, color-coded GIS existing land use maps for each township. Inspect and correct parcel line work and attribute codes, where needed.
- Plot final, color-coded existing land use maps at desired scale.
- Use the GIS to tabulate acreage figures by general land use category, jurisdiction and sub-watershed zone.

The steps in the process are conceptually simple. However, the level of effort required to prepare usable GIS coverages, verify and correct land use codes, and produce an accurate parcel-

specific land use data base was quite substantial given the extent of the Peconic Estuary watershed, the magnitude and complexity of the data bases involved, the inconsistent quality of the digitized tax map coverages among the towns, and the need to conduct extensive field verification.

Land Use Classification Conventions

Experience gained with the initial phases of the land use inventory and field check process resulted in the establishment of several conventions that were used to simplify and expedite the work, and help assure that land use code attributes were being assigned in a consistent manner by the several staff members involved. These conventions are summarized below.

- When more than one use was found to occur on a single parcel, the primary use of that parcel was determined and assigned to that parcel. Primary use is based on the relative intensity of the use in comparison with that of the other use(s) in question, with consideration also given to the areal extent of the use on the parcel. Typical examples follow:

- A 100-acre parcel is used for both residential and agricultural purposes. Crops are grown on about 80 acres, 15 acres are in woodlands, and a house is located on site. Even though the parcel accommodates three uses (including vacant), it is assigned a classification of agriculture, since most of the parcel is dedicated to this use.

- A two-story structure is located on a 10,000 sq. ft. lot in the retail portion of a central business district. A hardware store occupies the first story of the building and the second floor is used for an apartment. While used for both commercial and residential uses, this parcel is classified as commercial, given the relative intensity of the uses in question and the prevailing nature of neighboring retail uses.

- A country estate is located on an 18-acre parcel, some of which is wooded, with the remainder used as pasture. This parcel is classified as low density residential, given the fact that it falls within the density criteria of ≤ 1 d.u./acre.

- A road right-of-way parcel traverses a bay, but the improved portion of the parcel does not extend over the water. The entire parcel is classified as transportation.

- Dedicated common areas on tax map parcels in condominium/townhouse projects were classified as recreation and open space, since such areas are not available for development in the future. Small, privately owned parcels that are the sites for residential structures in these projects were classified as high density residential .
- Agricultural land that had reverted to old field habitat due to non-use was classified as vacant. Actively cultivated lands and those recently left fallow were classified as agriculture.
- When structures on improved parcels are unoccupied, the parcels are not classified as

vacant. They are classified according to the type of structure present, i.e., commercial, industrial, residential, etc.

- Whether a parcel is publicly owned or privately owned does not necessarily determine how that parcel is classified. For example, parcels classified as recreation and open space can be owned by property owners associations, private conservation groups, or private clubs, as well as public entities.
- Privately owned, commercially oriented, intensive recreational activities, such as bowling alleys and sports complexes, are classified as commercial.
- All publicly owned parks and conservation lands, whether actively or passively used, are classified as recreation and open space.
- Parcels owned by the Suffolk County Water Authority were classified as utility, regardless of whether the parcels were improved or not.
- The existing zoning designation of a parcel is not a factor in how that parcel is classified as to existing land use.
- The number of residential structures on a parcel, as opposed to the number of dwelling units, was used in conjunction with parcel acreage to determine density, and hence, the classification of the parcel as low, medium or high density residential.
- The context within which a parcel is located, i.e., the uses found on adjacent and nearby parcels, can often help in making judgments in the field as to how to classify that parcel.

- Parcels that are adjacent to commercial uses in business districts and are used as parking lots in connection with these uses were classified as commercial. Parcels used for parking that are directly related to a nearby transportation use, e.g., ferry or railroad, were classified as transportation.

The tax map base shows property boundaries, and not geographical features, the extent of various "surface covers" or datums. Hence, the boundary of a parcel located on the shoreline may, or may not, coincide with the location of the land/sea interface. The apparent shoreline on the existing land use maps, i.e., the boundary between parcels classified as surface waters and adjacent parcels classified as one of the 12 upland land use categories, should not be interpreted as the water's edge or mean sea level, etc. Overlay of the tax map base on appropriate maps, such as USGS topographic maps, can indicate the extent to which the shorelines replicate each other.

A lake or pond located within a larger tax map parcel will not be shown on the existing land use map as surface waters. If the lake/pond is a separate parcel, i.e., the shoreline is a property boundary, then it will be classified and shown as surface waters on the map.

Existing Land Use Map Accuracy

The Existing Land Use maps series shows thousands of parcels, each assigned to a land use category. In evaluating the accuracy of these maps, one has to consider two types of potential error. The first type is judgment error, resulting in the assignment of the wrong classification category to a particular parcel. The second type is attribute error, where the wrong classification is assigned to a parcel in the GIS data base, and this error is not detected in review of preliminary

maps. Given the extensive level of effort devoted to the PEP land use inventory, the staff is confident that the incidence of both types of error is very low. Users of the Existing Land Use map series and the acreage tabulations by land use category that are derived from the GIS data base should be aware of the methodology employed, so that proper interpretations can be made.

In addition to being assigned to a land use category, each parcel of property was assigned to a specific sub-watershed zone. All parcels assigned to a land use category, other than transportation, lie entirely within a specific sub-watershed zone. The transportation category was assigned to town-wide railroad and public right-of-ways that traverse sub-watershed zone boundaries. In order to maintain the integrity of the tax parcel data base, transportation right-of-ways were not segmented to conform to sub-watershed boundaries. As a result, the GIS was only capable of calculating a town-wide PEP acreage figure for the transportation category. Transportation acreage figures for each sub-watershed zone were estimated by multiplying the town-wide PEP transportation acreage total by the percentage of town-wide PEP study area acreage found in each sub-watershed zone. Since the parcels assigned to the other 12 land use categories were entirely located within a sub-watershed zone, the acreage calculations generated by the GIS for these categories did not have to be manually adjusted.

Further explanation may help to reduce confusion with respect to the differences between preliminary maps showing uses determined by assessor codes and existing land use maps prepared by using the land use methodology described herein. Each municipality can assign assessor codes to parcels in different ways according to local practice. In almost all towns, it is

evident that publicly owned parcels and other non-ratables often are not assigned any category. In addition, the assessor code data sets vary greatly by town in the extent and frequency of update. The use of this methodology and field verification assured comparability of inventory results across the watershed and their accuracy and suitability for planning purposes.

Time Frame

The staff conducted the field verification of land use for the six towns in the PEP land use study area in a sequential fashion over an 18 month period beginning in 1994. During the process of GIS file correction and map preparation, changes in the use of a few major parcels were noted after completion of field work. For all intents and purposes, the pattern of land uses as portrayed on the Existing Land Use map for each of the six towns should be considered as representative of 1995 conditions. This "snapshot" view of land use is, of course, static and will not reflect those incremental changes that have occurred as a result of more recent development activities.

RESULTS OF THE LAND USE INVENTORY

The results of the existing land use inventory are portrayed in map and numerical formats. The full color, computer generated maps that accompany this report are identified below.

- Land Use Inventory and Analysis Study Area Map - This map of the East End of Suffolk County shows the entire land use study area, local government jurisdictional boundaries and major roads.
- Study Area Map Series - This map series consists of a parcel-specific base map for each of the six towns in the Peconic Estuary watershed. The maps show the land use study area in each town, and the sub-watershed zone boundaries and their code designations within each study area. (Note: there is a total of 45 sub-watershed zones in the entire study area.)
- Existing Land Use Map Series - This map series also consists of a parcel-specific base map for each of the six towns in the watershed. The full color maps portray the distribution of 13 land use categories as of 1995 within the study area of each town.

The GIS was utilized to generate land use acreage data from the tax map parcel/land use data base, which is depicted on the Existing Land Use maps. These data are grouped by land use category, land use study area, local government jurisdiction and sub-watershed zone.

The availability of the land use maps and data base referenced above should preclude future use of the land use characterizations contained in BTCAMP documentation (Suffolk

Peconic Estuary Program Existing Land Use Inventory

County Dept. of Health Services 1992). The results of the existing land use inventory are discussed below.

Overview of Entire PEP Land Use Study Area

The PEP land use study area encompasses approximately 128,000 acres. There are over 58,000 real property parcels within this study area. The total upland acreage and number of real property parcels by town for both the area within the PEP boundary and the town as a whole are shown in Table 2. The percentage of upland acreage within the PEP boundaries for each of the six towns is graphically shown in Chart 1. Chart 2 displays the percentage composition of upland acreage in the PEP study area by town.

Table 2. Total Upland Acreage and Number of Parcels in PEP Study Area and Town-wide Boundaries

	Brookhaven	Riverhead	Southold	Shelter Island	Southampton	East Hampton	Total
Upland Acreage Town-wide	166,016	43,330	34,368	7,634	89,728	46,912	387,988
Upland Acreage in PEP	11,891	22,034	23,161	7,634	32,596	31,041	128,357
% of Upland Acreage in PEP	7%	51%	67%	100%	36%	66%	33%
Number of Parcels Town-wide	175,968	12,977	18,324	3,649	49,397	25,937	286,252
Number of Parcels in PEP	1,749	7,088	13,439	3,649	17,067	15,068	58,060
% of Number of Parcels in PEP	1%	55%	73%	100%	35%	58%	26%

Peconic Estuary Program Existing Land Use Inventory

Chart 1.

Chart 2.

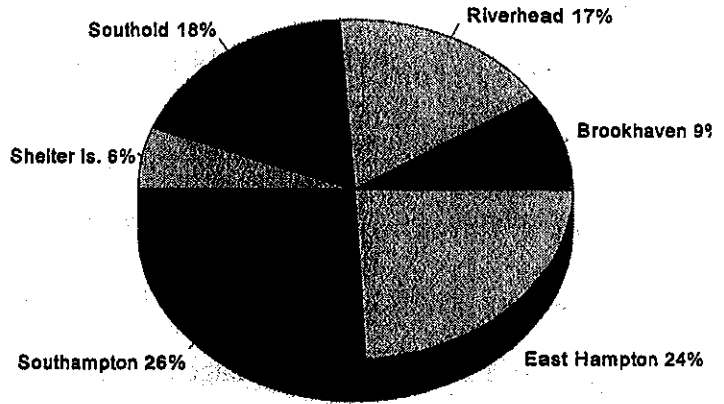
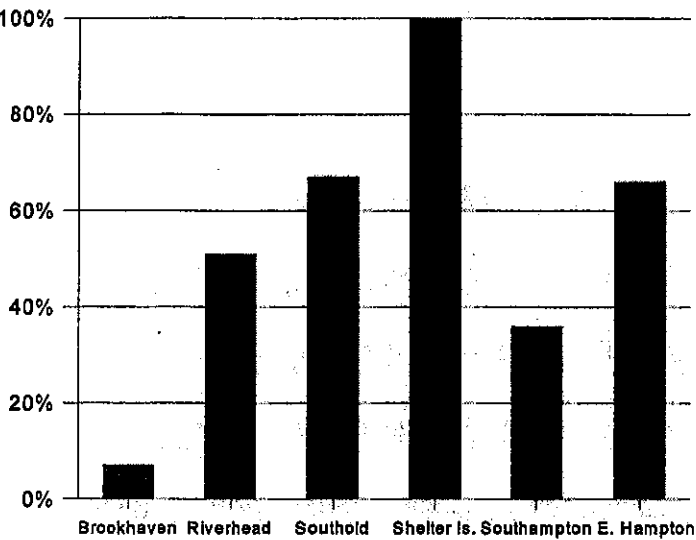


Chart 1. Portion of Town-wide Upland Acreage in PEP Study Area

Chart 2. Composition of Upland Acreage in PEP Study Area by Town

Table 3 is a summary of the upland acreage by land use category for each of the six towns. Nearly 60% of the PEP acreage is in the following three land use categories: vacant; recreation and open space; and agriculture. Recreation and open space property and vacant land each account for nearly 25% of the total study area acreage. Most of the agricultural acreage, which comprises over 10% of the total land area, is located on the north fork. Less than 25% of the PEP watershed is residentially developed. Commercial and industrial uses account for approximately 5% of the study area acreage. Institutional acreage accounts for another 5%. Seven percent of the study area has been assigned to the transportation category, which consists primarily of road and railroad right-of-ways.

Table 3. Upland PEP Land Use Acreage by Town - 1995

	Brookhaven	Riverhead	Southold	Shelter Island	Southampton	East Hampton	Total	Percent
Low density residential	414	1,116	3,555	1,810	4,905	3,911	15,711	12%
Medium density residential	194	1,311	3,175	837	3,235	3,192	11,944	9%
High density residential	9	376	206	14	392	183	1,180	1%
Commercial	15	606	420	146	804	224	2,415	2%
Industrial	116	3,339	99	13	122	20	3,709	3%
Institutional	5,205	232	1,107	124	333	102	7,103	6%
Recreation & open space	2,439	3,842	2,822	2,614	9,246	10,945	31,908	25%
Agriculture	526	7,186	5,933	156	692	46	14,539	11%
Vacant	2,056	2,383	4,176	1,371	9,772	9,894	29,652	23%
Transportation	794	1,325	1,562	501	2,408	2,214	8,804	7%
Utilities	51	75	28	3	194	88	439	0%
Waste handling	2	16	0	27	176	30	251	0%
Surface waters (fresh)	70	27	78	18	317	192	702	1%
TOTAL	11,891	22,034	23,161	7,634	32,596	31,041	128,357	100%

Town of Brookhaven

The headwaters of the Peconic River, which start just west of the William Floyd Parkway in the Town of Brookhaven, form the western terminus of the study area. The boundary in the Town encompasses a relatively narrow strip of land lying adjacent to the Peconic River starting from the headwaters of the river and extending east to the Town of Southampton boundary line. As illustrated in the Town of Brookhaven Study Area map, the acreage within the Town is divided into three sub-watershed zones. The acreage distribution by land use category within the PEP sub-watershed zones in the Town of Brookhaven is shown in Table 4. Nearly 12,000 acres, approximately 7% of the upland acreage in the Town of Brookhaven, are within the study area boundary. The Existing Land Use map for the Town of Brookhaven shows that the Brookhaven National Laboratory property is classified as an institutional use; it comprises 44% of the total study area acreage in the Town. Recreation and open space property, primarily owned by

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Suffolk County, and vacant property account for 21% and 17%, respectively. Residential use comprises only 5% of the total. Agricultural acreage is concentrated in the Manorville area and accounts for another 4%. Most of the remaining 9% is in the transportation category and includes right-of-ways for the Long Island Railroad, Long Island Expressway, William Floyd Parkway, etc. The only industrial site of any significance is a 100+ acre parcel south of Nugent Drive containing an asphalt plant.

Table 4. PEP Land Use Acreage: Town of Brookhaven - 1995

LAND USE CATEGORY	SUB-WATERSHED ZONE			TOTAL	PERCENT
	10	20	30		
Low density residential	236	129	49	414	3%
Medium density residential	64	60	70	194	2%
High density residential	0	0	9	9	0%
Commercial	5	10	0	15	0%
Industrial	0	11	105	116	1%
Institutional	5,187	18	0	5,205	44%
Recreation & open space	718	1,095	626	2,439	21%
Agriculture	294	232	0	526	4%
Vacant	733	688	635	2,056	17%
Transportation	337	262	195	794	7%
Utilities	16	21	14	51	0%
Waste handling	0	0	2	2	0%
Surface waters (fresh)	0	3	67	70	1%
TOTAL	7,590	2,529	1,772	11,891	100%

Town of Riverhead

Urban → Total - (R + A + U)

The PEP study area in the Town of Riverhead overlays the southern half of the Town from the Town of Brookhaven/Riverhead boundary line east to the Town of Riverhead/Southold line. The acreage in the Town is divided into eight sub-watershed zones as shown in the Town of Riverhead Study Area map. The acreage distribution by land use category within the eight sub-watershed zones in the Town of Riverhead is shown in Table 5. Approximately 22,000 acres,

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which represents just over 50% of the upland acreage of the entire Town of Riverhead, are within the boundaries of the PEP study area. The Existing Land Use map for the Town of Riverhead illustrates that agricultural land accounts for about one-third of the PEP acreage within the Town. Recreation and open space properties are located primarily in the Calverton area and comprise 17% of the town study area. Suffolk County owns most of the open space as a result of its Peconic River corridor acquisitions. The former Grumman facility at Calverton accounts for most of the industrial acreage, which is approximately 15% of the town study area. Residential and vacant land uses occupy 13% and 11%, respectively. Transportation related activities occupy another 6%.

Table 5. PEP Land Use Acreage: Town of Riverhead - 1995

LAND USE CATEGORY	SUB-WATERSHED ZONE								TOTAL	PERCENT
	10	20	30	40	50	60	70	80		
Low density residential	75	71	190	116	169	159	201	135	1,116	5%
Medium density residential	11	16	74	400	233	149	236	192	1,311	6%
High density residential	0	5	175	108	33	2	37	16	376	2%
Commercial	7	16	247	407	48	26	39	16	806	4%
Industrial	6	2,974	150	53	119	33	4	0	3,339	15%
Institutional	0	0	19	180	26	2	1	4	232	1%
Recreation & open space	1,353	1,753	39	263	284	24	20	106	3,842	17%
Agriculture	0	765	1,021	139	1,098	770	1,598	795	7,186	33%
Vacant	63	346	440	606	279	237	279	133	2,383	11%
Transportation	33	179	323	293	171	88	134	104	1,325	6%
Utilities	0	0	37	36	0	2	0	0	75	0%
Waste handling	0	0	0	16	0	0	0	0	16	0%
Surface waters (fresh)	0	6	1	19	0	0	1	0	27	0%
TOTAL	1,548	6,131	2,716	2,636	2,460	1,492	2,550	2,501	22,034	100%

Town of Southold

The southern two-thirds of the Town of Southold, extending from the Town of Riverhead/Southold line to Orient Point, lie within the boundaries of the PEP study area. The

PEP acreage in the Town is divided into nine sub-watershed zones, as shown in the Town of Southold Study Area map. The acreage distribution by land use category within the nine sub-watershed zones in the Town of Southold is shown in Table 6. The Existing Land Use map for the Town of Southold illustrates that over 26% of the town-wide acreage is in agricultural use. Thirty percent of the acreage is committed to residential use. Generally, the residential development is situated in close proximity to the shoreline while the agricultural property is located on large interior lots. Vacant property accounts for 18% of the town study area. Recreation and open space comprises only 12% of the town study area; Orient Point State Park and its underwater lands, as well as publicly owned wetlands in Orient, are the largest holdings in this category. Transportation related activities occupy 7% of the study area. Most of the institutional acreage in the town study area is located on Plum Island.

Table 6. PEP Land Use Acreage: Town of Southold - 1995

LAND USE CATEGORY	SUB-WATERSHED ZONE										TOTAL	%
	0	10	20	30	40	50	60	70	80	90		
Low density residential*	455	279	411	444	619	940	137	203	14	53	3,555	15%
Medium density residential	0	297	422	542	375	1,264	106	107	7	55	3,175	14%
High density residential	0	14	7	12	8	156	5	4	0	0	206	1%
Commercial	0	49	41	51	13	243	14	5	4	0	420	2%
Industrial	0	18	0	9	8	63	1	0	0	0	99	0%
Institutional**	823	45	19	55	1	137	25	1	0	0	1,107	5%
Recreation & open space	0	144	192	111	115	513	66	446	1,225	10	2,822	12%
Agriculture	0	922	1,014	1,007	1,116	910	123	841	0	0	5,933	26%
Vacant	0	394	428	387	515	1,910	111	389	25	17	4,176	18%
Transportation	0	141	178	209	184	628	50	118	23	31	1,562	7%
Utilities	0	0	2	3	1	21	0	0	1	0	28	0%
Waste handling	0	0	0	0	0	0	0	0	0	0	0	0%
Surface waters (fresh)	0	29	23	0	0	26	0	0	0	0	78	0%
TOTAL	1,278	2,332	2,737	2,830	2,955	6,811	639	2,114	1,299	166	23,161	100%

*Robins Island (455 acres) is included in sub-watershed zone 0 and is classified as low density residential.

**Plum Island (823 acres) is included in sub-watershed zone 0 and is classified as institutional.

Town of Shelter Island

The only town that lies entirely within the PEP watershed is the Town of Shelter Island.

The upland acreage in the Town is divided into seven sub-watershed zones, as shown in the Town of Shelter Island Study Area map. The acreage distribution by land use category within the seven sub-watershed zones in the Town of Shelter Island is shown in Table 7. It can be seen from the Existing Land Use map for this town that approximately one-third of the Island is classified as residential land use. Recreation and open space acreage, primarily that of The Nature Conservancy's Mashomack Preserve, comprises another one-third of the Town. Vacant land accounts for 18% of the acreage. Transportation related activities occupy another 7%.

Table 7. PEP Land Use Acreage: Town of Shelter Island - 1995

LAND USE CATEGORY	SUB-WATERSHED ZONE							TOTAL	PERCENT
	10	20	30	40	50	60	70		
Low density residential	194	532	364	150	273	281	16	1,810	24%
Medium density residential	67	156	126	49	213	200	26	837	11%
High density residential	0	10	1	0	2	1	0	14	0%
Commercial	0	52	24	7	40	21	2	146	2%
Industrial	0	1	0	0	0	12	0	13	0%
Institutional	3	35	53	0	2	31	0	124	2%
Recreation & open space	248	134	1,019	16	35	36	1,126	2,614	R 34%
Agriculture	0	48	0	0	19	89	0	156	A 2%
Vacant	220	238	195	70	307	318	23	1,371	✓ 18%
Transportation	46	102	156	28	77	86	6	501	7%
Utilities	0	3	0	0	0	0	0	3	0%
Waste handling	0	0	0	0	0	27	0	27	0%
Surface waters (fresh)	0	0	0	0	0	18	0	18	R 0%
TOTAL	778	1,311	1,938	320	968	1,120	1,199	7,634	100%

Town of Southampton

The PEP study area in the Town of Southampton covers the northern portion of the Town from the Town of Riverhead/Southampton line east to the town of Southampton/East Hampton line. The PEP acreage in the Town is divided into 11 sub-watershed zones, as shown in the Town of Southampton Study Area map. The acreage distribution by land use category within the 11 sub-watershed zones in the Town of Southampton is shown in Table 8. Nearly 33,000 acres, which account for over 36% of the upland acreage of the Town of Southampton, are within the study area boundary. The Existing Land Use map for the Town of Southampton illustrates that 30% of the PEP upland acreage within the Town is still vacant. Recreation and open space parcels comprise 28% of the town study area. Most of the recreational properties are owned by Suffolk County and New York State, and are situated west of the Shinnecock Canal.

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Residentially developed lots account for 26% of the PEP acreage within the Town.

Transportation related activities occupy another 7%. The Bridgehampton Raceway is shown as commercial and represents the overwhelming majority of property included in this land use category. A small amount of agricultural use exists south of the terminal moraine and east of the Shinnecock Canal. The Town of Southampton North Sea landfill accounts for most of the acreage found in the waste handling and management land use category. The Shinnecock Indian property situated west of the Shinnecock Canal, and the Riverhead County Center comprise most of the institutional acreage.

Table 8. PEP Land Use Acreage: Town of Southampton - 1995

LAND USE CATEGORY	SUB-WATERSHED ZONE											TOTAL	PERCENT
	10	20	30	40	50	60	70	80	90	100	110		
Low density residential	0	55	396	305	1,158	1,585	456	507	103	30	310	4,905	15%
Medium density residential	0	129	362	334	379	935	262	611	50	55	118	3,235	10%
High density residential	0	99	68	17	38	48	47	60	2	12	1	392	1%
Commercial	0	43	30	15	71	62	539	41	0	0	3	804	2%
Industrial	0	1	1	0	25	21	50	24	0	0	0	122	0%
Institutional	0	105	12	116	28	6	2	21	0	42	1	333	1%
Recreation & open space	175	714	4,842	506	1,008	836	485	486	179	6	9	9,246	28%
Agriculture	0	0	6	0	6	282	106	292	0	0	0	692	2%
Vacant	1	219	1,737	495	1,022	3,372	1,289	1,032	421	24	160	9,772	30%
Transportation	14	200	413	206	370	545	268	271	28	30	63	2,408	7%
Utilities	13	40	66	0	3	40	15	17	0	0	0	194	1%
Waste handling	0	0	0	20	0	132	0	24	0	0	0	176	1%
Surface waters (fresh)	0	69	0	0	0	103	5	140	0	0	0	317	1%
TOTAL	203	1,674	7,933	2,014	4,108	7,967	3,524	3,526	783	199	685	32,596	100%

Town of East Hampton

The PEP study area in the Town of East Hampton covers the northern portion of the Town from the Town of Southampton/East Hampton line east to Montauk Point. The PEP acreage in the Town is divided into seven sub-watershed zones, as shown in the Town of East

Peconic Estuary Program Existing Land Use Inventory

Hampton Study Area map. The acreage distribution by land use category within the seven sub-watershed zones in the Town of East Hampton is shown in Table 9. Over 31,000 acres, or 66% of the upland acreage in the Town of East Hampton, are within the study area boundary. The Existing Land Use map for the Town of East Hampton illustrates that 35% of the PEP acreage within the Town is classified as recreation and open space. The vast majority of the open space is owned by either New York State or Suffolk County. Vacant property accounts for 32% of the PEP acreage in the Town. Approximately one-fourth of the town study area is used for residential purposes. Transportation related activities occupy another 7%.

Table 9. PEP Land Use Acreage: Town of East Hampton - 1995

LAND USE CATEGORY	SUB-WATERSHED ZONE								TOTAL	%
	0	10	20	30	40	50	60	70		
Low density residential	0	1,125	1,200	1,246	87	55	198	0	3,911	13%
Medium density residential	0	451	1,430	706	12	195	389	9	3,192	10%
High density residential	0	26	34	15	7	59	42	0	183	1%
Commercial	0	21	49	23	3	39	89	0	224	1%
Industrial	0	0	0	0	0	14	6	0	20	0%
Institutional	0	39	0	40	1	14	2	6	102	0%
Recreation & open space	0	2,653	876	1,046	801	3,060	304	2,205	10,945	35%
Agriculture	0	0	15	5	0	0	26	0	46	0%
Vacant*	3,319	1,746	1,830	1,562	82	416	595	344	9,894	32%
Transportation	0	387	556	337	106	376	288	165	2,214	7%
Utilities	0	23	0	0	23	23	19	0	88	0%
Waste handling	0	0	0	0	0	30	0	0	30	0%
Surface waters (fresh)	0	3	3	0	0	186	0	0	192	1%
TOTAL	3,319	6,474	5,993	4,980	1,122	4,466	1,958	2,729	31,041	100%

*Gardiners Island (3,319 acres) is included in sub-watershed zone 0 and is classified as vacant.

DISCUSSION

The provision of an accurate, existing land use data base at tax map scale for the Peconic Estuary watershed and the availability of reliable estimates of the number of people who live in this watershed on a year-round and seasonal basis from a companion study (Suffolk County Dept. of Planning 1997) enable better definition and understanding of the human dimension in the effort to characterize the Peconic Estuary System. The data bases allow comparisons to be made among different municipalities, sub-watershed zones or geographic areas in the watershed, since the methods employed to classify land use and estimate population were consistently applied across the study area.

By example, it is interesting to note the land use characteristics of the Peconic River/Flanders Bay watershed and compare them with those of the eastern portion of the land use study area and the study area as a whole, given the focus of the BTCAMP on water quality problems in the western end of the Peconic Estuary. Table 10 shows the results of such analysis, where the 13 general land use categories have been grouped in the two broader classifications of "undeveloped" lands (vacant, recreation and open space, agriculture and surface waters) and "developed" lands (low density, medium density and high density residential; commercial, industrial, institutional, transportation, utilities and waste handling). It is surprising to see that the extent of "development" is remarkably consistent for both the western and eastern portions of the Peconic Estuary watershed, and hence, for the entire study area as well. All these areas are

about 40% “developed” and 60% “undeveloped.” Different results, however, could be expected for a similar analysis conducted at the sub-watershed level.

Table 10. Comparison of Generalized Land Use in the Western and Eastern Portions of the Peconic Estuary Watershed

	Western Portion Peconic Estuary Watershed ¹	Eastern Portion Peconic Estuary Watershed ²	Peconic Estuary Watershed
total upland area (acres)	45,749	82,608	128,357
total “developed” area ³	18,456	33,100	51,556
total “undeveloped” area ⁴	27,293	49,508	76,801
percent “developed”	40.3%	40.1%	40.2%
percent “undeveloped”	59.7%	59.9%	59.8%

¹ The western portion includes the entire PEP land use study areas in the Towns of Brookhaven and Riverhead, and sub-watersheds 10, 20, 30 and 40 in the Town of Southampton. It encompasses the Peconic River/Flanders Bay drainage area.

² The eastern portion includes the entire PEP land use study areas in the Towns of Southold, Shelter Island and East Hampton; and sub-watersheds 50 through 110 in the Town of Southampton.

³“Developed” land areas were defined to include the following categories: low density residential, medium density residential, high density residential, commercial, industrial, institutional, transportation, utilities and waste handling.

⁴“Undeveloped” land areas were defined to include the following categories: recreation and open space, vacant, agriculture and surface waters (fresh).

The GIS format of the land use data base facilitates land use data manipulation, data base expansion to include those portions of the East End towns located outside the watershed, and potential update at appropriate time intervals in the future. An opportunity also exists for using the data base to improve application of watershed simulation models for priority sub-watersheds at large scale. Pollutant loadings are calculated by these models. Model parameter estimates could be strengthened through analysis of land use type/surface cover relationships (Swaney, Sherman and Howarth in press).

The current distribution of land uses in the Peconic Estuary watershed has been mapped and quantified, and the population determined. The Planning Department is using the GIS data base to predict how the region could be developed in the future, given certain zoning and build-out assumptions. Increases in population associated with the development of available land will also be estimated. All of this provides input to the PEP process of evaluating water quality and natural resource scenarios, and specifying alternative recommendations designed to achieve management goals for the Peconic Estuary at both regional and parcel-specific scales.

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